

EVER WONDER WHAT HAPPENS TO YOUR WATER TESTS?

by Mary Alvey

Do you get letters from us or calls saying we didn't receive the report for one of the many tests you do to ensure that your water is safe to drink? Do you know whether or not you have done all of the testing required? You can access our database anytime day or night and check to see that your reports are credited on time and accurately to your water system. Just log on to the internet using any browser and go to this location: 159.121.19.167. Type just these numbers - **NO WWW** or **.COM**.

From there you can select your water system by PWS ID number or search by name. You will find a list of all reports received and the results for coliform (bacteria), chemicals, operational reports, and public notices along with a listing of any violations assigned to your system and any enforcement actions taken by our office. If you find that we are missing reports you believe should have been sent to us, contact your laboratory and clarify who is doing the reporting. Sometimes the report does not reach us in time. All reports are due within 10 days after the end of the monitoring period. If you collect your sample late in the period, it is more likely it will reach us in time if your lab reports directly to us.

We receive thousands of reports each month and make every effort to ensure that the data is correct and you are credited with the testing you are doing. When reports are unidentified or incomplete, they have to be set aside until we can get to them or returned to you for more information. They may not get back to us in time to avoid a [non]reporting violation.

Here are some other things you can do to ensure that your reports get credited to your system:

- 1) Know and use your PWS ID number on all samples submitted to the lab. That ensures that the proper test method for public water systems will be used and the final report will identify your system and be in the correct format.
- 2) Be sure you provide complete information on the date and time the sample was collected, the sample site, and the type of sample. For coliform testing, you must identify the sample as "Routine" "Repeat" or "Special". If

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DRINKING WATER PROGRAM UPDATE

by Dave Leland

So much to write about, so little space and time.... This time I selected the following "front burner" topics: Consumer Confidence Reports, On-Line Drinking Water Data Access, and drinking water Continuing Education Units.

Consumer Confidence Reports

First, the bad news - **your 1999 CCR is due July 1!** Now, the good news - how did you all do on the first report, for calendar year 1998? The first reports got some scrutiny by the Public Interest Research Group (PIRG), a national organization representing state PIRGs (in Oregon, OSPIRG). PIRG constructed a "grading" scheme and reviewed 430 CCRs from a total of 20 states, including 23 CCRs from Oregon communities. The national report, found at www.pirg.org, concludes that 82% of Oregon communities submitted a CCR, and that this effort represented 99% of the Oregon population served by community water systems. The 23 Oregon CCRs reviewed earned 7 "A" grades, 8 Bs, 3 Cs, 1 D, and 4 Fs, according to the PIRG grading. Overall, this looks like a B- for Oregon, while the US overall got a C or C-. Overall, Oregon communities made a good effort!

So, how to improve your CCR for 1999? Talk to your users! There are also some good suggestions in the PIRG report. Continue to make use of the tools available to you, including the Rural Water Association report template, available from the Oregon Assn. of Water Utilities (503-873-8353), and the SWS On-Line Drinking Water Data Access Internet site (<http://159.121.19.167>).

SWS On-Line Drinking Water Data Access

Speaking of our Internet data access site, we recently developed the first statistics about usage. We analyzed the period of

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YOU GOT OUR NUMBER!

Contact counties are responsible for all community water systems with groundwater sources serving less than 3,300 people as well as all nontransient noncommunity and transient noncommunity water systems. Operators and managers of these systems should call their county health department first for assistance with drinking water issues.

State staff are responsible for all community water systems using surface water sources and those community systems serving 3,300 or more people. In those counties without a local health department contact, please call the state program at (503) 731-4317.

Contract Counties

The Drinking Water Program contracts with the following counties to perform much of the program work at the local level.

Benton	Bob Wilson/Ron Smith	(541) 757-6841
	Email: ronald.e.smith@co.benton.or.us	
Clackamas	Steve Dahl	(503) 557-2836
	mail: steved@co.clackamas.or.us	
Columbia	Mark Edington	(503) 366-3828
Coos	Tracey Warr	(541) 756-2020
Crook	Russell Hanson/Ann McSheery	(541) 447-8155
	hanson_russ@hotmail.com	
Curry	Mike Meszaros	(541) 247-5501
Douglas	Dave Bussen/Gerry Meyer	(541) 440-3571
	Email: gvmeyer@co.douglas.or.us	
Hood River	Mike Christman	(541) 386-1115
	Email: healthdept@gorge.net	
Jackson	John Manwaring	(541) 774-8206
	Email: manwarjs@hhs.co.jackson.or.us	
Jefferson	Jerry Street	(541) 475-4456
	Email: Jerry_Street@class.oregonvos.net	
Josephine	Bill Olson/Bruce Cunningham	(541) 474-5334
	Email: bolson@co.josephine.or.us	
Klamath	Susan Burch	(541) 883-1122
	Email: s.burch@co.klamath.or.us	
Lincoln	Amy Chapman	(541) 265-4179
	Email: achapman@co.lincoln.or.us	
Linn	John McEvoy	(541) 967-3821
	Email: envhlth@co.linn.or.us	
Malheur/Baker	Ray Huff/Susan Fuller	(541) 473-5186
	Email: envhealth@malheurco.org	
Marion	Rick Sherman	(503) 588-5346
	Email: rsherman@cyberis.net	
Multnomah	Frank Dennis	(503) 248-3400
	Email: frank.r.dennis@co.multnomah.or.us	
Polk	Jim Solvedt	(503) 623-9237
	Email: CLEMENS.GENE@co.polk.or.us	
Tillamook	Annette Pampush	(503) 842-3902
	Email: apampush@co.tillamook.or.us	
Wasco/Sherman	Glenn Pierce/John Zalaznik	(541) 296-4636
	Email: wascophd@gorge.net	
Washington	Toby Harris/Mark Hanson	(503) 648-8722
	Email: tobyharris@washington.co.or.us	

Drinking Water Program Web Site www.ohd.hr.state.or.us/cehs/dwp
Data Search Web Page (type only numbers) **159.121.19.167**

To locate a well log www.wrd.state.or.us/groundwater/gridweb

PNWS/American Water Works Association (AWWA) (503) 655-4075

J.L. Grycko, Secretary-Treasurer Oregon Association of Water Utilities (OAWU) (503) 873-8353

Jason Green, Program Manager

3/28/2000

State Program

Technical staff members are frequently in the field assisting water systems. Each day one staff member serves as *phone duty person* in the Portland office and is available to answer questions at (503) 731-4317. Please make use of this person unless you feel you must speak with a specific staff member.

Another option is to contact a staff person's voice mail directly. To do this, call our auto-attendant number (503) 731-4821 and when directed by the recording, dial the person's extension listed below.

General Inquiries (503) 731-4317
Portland office fax (503) 731-4077
Voice mail (503) 731-4821 + ext.

Drinking Water Administration: (503) 731-4010

Dave Leland, Program Manager ext. 757
 Diane Weis ext. 751

Technical Services: (503) 731-4899

Western Region

Tom Charbonneau, Manager ext. 749
 Scott Curry (Grants Pass) (541) 474-3101 ext. 211
 Carrie Gentry ext. 742
 Bonnie Waybright ext. 752
 Marsha Fox ext. 762

Eastern Region

Pendleton office fax (541) 276-4778
 Gary Burnett, Manager (Pendleton) (541) 276-8006
 John Potts (Corvallis) (541) 757-4281
 Kari Salis (Portland) ext. 764
 Bart Stepp (Pendleton) (541) 276-8006

Monitoring and Compliance: (503) 731-4381

Mary Alvey, Manager ext. 748
 Annette Hunt ext. 747
 Roberta Lindgren ext. 741
 Patrick Meyer ext. 753
 Mike Patterson ext. 746
 Georgine Proctor ext. 761
 Brian Rigwood ext. 743
 Nancy Stellmach ext. 760
 George Waun ext. 758
 John Davis ext. 754

Protection and Development: (503) 731-4317

Chris Hughes, Manager ext. 750
 Jeff Frederick (Springfield) (541) 726-2594
 Mike Grimm ext. 765
 Dennis Nelson (Springfield) (541) 726-2587
 Springfield office fax (541) 726-2596
 Tom Pattee (Springfield) (541) 726-2588
 Alison Schutt (Springfield) (541) 726-2589
 Dave Phelps ext. 759
 Kurt Putnam ext. 740
 Karen Kelley (Springfield) (541) 726-2586
 Cassandra Walker ext. 763

Lab certification, Public Health Laboratory, Portland:

Dr. Irene Ronning, Coordinator (503) 229-5505

WATER TESTS (continued from page 1)

you forget to identify the sample, we will return the report and there may not be time for you to return it to us to get credit for the testing.

- **Repeat** samples must include the date of the positive “Routine” sample that they follow.
 - **Repeat** samples are collected to investigate a positive routine sample. They need to be collected from specific sites and in specific numbers for your water system. They should help you investigate a potential problem and narrow down the extent or seriousness of a problem. They can be used to identify a bad sample tap or distribution as opposed to source problem.
 - **Special** samples are not counted as compliance samples. Special should be used where the water is not being served to users (before bringing a well back into service or before you open for the season) or when a sample is collected from a site not on your normal routine sample plan (example: in response to a user complaint).
 - **5 Routines** are required in the month following a positive routine even if the repeats were negative and there was no MCL (water quality) violation.
- 3) If the lab tells you the sample does not meet standards (coliform positive/present) call your county health department or us to discuss the follow up sampling required and how to identify these follow up samples. Often the correct number of samples are taken but they are misidentified and you do not get credit. Sometimes you need to do something before taking any more samples. We might be able to save you money and help you stay in compliance.
- 4) Attend our Water Systems Training Class if you need help on why, when and how to sample. These classes are offered free of charge throughout the state and you can earn Continuing Education Credits. You will be notified when one is in your area or you can check our Website for the schedule for the current year. The website is located at: www.ohd.hr.state.or.us/dwp
- 5) For chemical samples, clearly identify what source (well or intake) the sample represents and whether it was collected before or after any treatment. Collect samples early in the monitoring period so that the lab has time to complete the analysis and report the results before the deadline.

Please take that extra minute before you send the sample off to the lab or send the report to us, to make sure it is complete. We can't correct your mistakes but we do promise to handle your reports carefully and correct any mistakes we make.

Mary Alvey, RS, is manager of the Monitoring & Compliance Unit of the Drinking Water Program / (503) 731-4381 or mary.b.alvey@state.or.us

CROSS CONNECTION UPDATE

by Bonnie Waybright

The current list of approved backflow assemblies is dated April 6, 2000. The list will be updated annually with addendums added quarterly. Call (503)731-4317 to request a copy.

Certified Testers and Inspectors

Have you scheduled your **Backflow Assembly Tester Recertification or Cross Connection Inspector Update** yet? If not, now is a good time to do it.

Every renewal time brings with it the rush of people looking for last minute classes. This results in classes that are too full, locations that are difficult to travel to, and too often, inspectors taking tester recertification classes for the CEUs. This would be a good time to get into a class at *your* convenience. Classes taken now will be accepted for renewal in 2001. Why not get it out of the way now?

Inspectors, remember that you may renew with 0.5 CEUs related to cross connection control. Keep your eyes open for classes that allow you to accumulate these CEUs. This includes AWWA and OAWU Short Schools, ABPA conferences and seminars, and OCCIRS training.

Backflow Prevention Assembly Approval

From time to time, the question arises, “Will the modification I’m contemplating void the approval of this assembly?” There are some modifications that are permissible and others that are not.

Acceptable modifications:

- Shut-off valves may be replaced with different approved shut-off valves without voiding the approval of the assembly. The shut-off valves that are acceptable substitutions for a particular assembly are listed with a lower case letter code after the model number and size for that assembly in the *Approved Backflow Prevention Assembly List* (The List). The key to these letter codes are included in The List.
- By-pass meters in detector assemblies may be replaced with different approved meters without voiding the approval of the assembly. The meters that are acceptable substitutions for a particular assembly are listed with an uppercase letter code after the model number and size for that assembly in The List.

Unacceptable modifications:

- Creating a detector assembly from a standard assembly will void the approval of the assembly. Some manufacturers are willing to allow this conversion and will issue a new serial number for the converted assembly. The Health Division will not accept these conversions.
- Replacing a shut-off valve with a different shut-off valve that is not specifically approved for the assembly will void the approval of that assembly.
- Replacing discs, springs, or other components with unapproved parts will void the approval of an assembly. When a disc, spring, or other part is worn or fails, it must be replaced

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CROSS CONNECTION UPDATE *(Continued from page 3)*

with the correct original manufacturer's replacement part. A disc may not be "flipped" to repair the assembly. A spring may not be stretched to repair the assembly. These types of repairs will void the approval of the assembly. In addition, if it can be shown that such repairs were done by a certified tester, the tester's certification will be revoked.

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DRINKING WATER PROGRAM UPDATE *(Continued from page 1)*

August 24, 1998, through April 18, 2000. There were 92,208 successful requests for information, steadily increasing each month, with over 13,000 requests in March, 2000. The site was accessed at all hours of the day and on all days of the week, with the heaviest traffic during the week and during business hours. The inventory, coliform, and name lookup pages were most popular.

Managing the huge and increasing volume of water quality compliance data coming in to us every day has become a major challenge for our program as well as for you (see article, page 1). It is increasingly important for you to submit your lab data on time and with the appropriate forms filled out completely, clearly, legibly, and accurately. Don't assume that we will be able to figure out what you meant to tell us. We hope that you will use the data access site to periodically review your water system's status and record, and to help us to portray your compliance record to EPA and the public in as accurate, timely, and complete a manner as possible. Contact Mary Alvey, Monitoring and Compliance Unit manager, at 503-731-4381 if you have questions about your information displayed on the site.

Continuing Education Units - Relevancy

Many of you indicated some surprise recently that not all of the sessions presented at short schools and workshops receive Oregon drinking water CEU credits. This is a result of efforts by drinking water organizations and community colleges over the past several years to diversify the training programs they present to better serve an increasingly diverse workforce, and to be inclusive of all water supply professionals regardless of their area of interest or job assignment. Oregon drinking water CEUs, however, are intended specifically to support the Oregon water treatment and water distribution operator certification system, and are therefore more narrow in scope than some available training. In some cases, parts of a particular session will receive drinking water CEUs. To help you make the best decisions about specific training to attend, we have prepared a short paper entitled "Continuing Education for Professional Growth" which describes eligibility of any training for drinking water certification CEUs. You will find this on our home page and we hope that you will find it useful. If you have specific questions about CEU relevancy, contact Brian Rigwood at (503) 731-4899.

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GROUND WATER RULE PROPOSED

by Gary Burnett

Introduction

The proposed Ground Water Rule (GWR), which was announced by EPA April 17, has been a long time coming. Through the 1986 amendments to the Safe Drinking Water Act (SDWA), ground water disinfection was suggested as a treatment standard to protect water systems from potential viral contamination, just as the Surface Water Treatment Rule (SWTR) was established to protect water supplies from parasites. In either case, coliform sampling is not adequate to determine whether or not pathogens such as viruses or parasites are in the water supply.

Rather than require mandatory disinfection of all ground water systems with associated exception criteria, as originally conceived, the current rule specifies certain criteria under which a system must provide treatment of ground water. The major elements of the proposed rule are sanitary surveys, hydrogeologic sensitivity assessments, and source water monitoring. The Health Division has revised sanitary survey procedures to meet the new rules, and a recent Pipeline article reviewed significant deficiencies in a water system. The Division has also been working on Source Water Assessments of ground water systems, and these assessments are expected to meet the requirements for the hydrogeologic sensitivity assessments under the GWR.

The Health Division has routinely recommended that source water samples be taken at the wellhead, particularly if there are coliform occurrences in the distribution system. And, current Health Division rules require that ground water systems be continuously disinfected if violations of the total coliform rule are attributed to source water quality. Treatment in such cases must be sufficient to achieve 4-log inactivation of viruses.

So, to prepare for the new Ground Water Rule; identify and correct sanitary deficiencies, pay attention to wellhead protection issues, and take source water samples (total/fecal coliform) at the wellhead.

EPA will take public comment on the proposed Ground Water Rule for 60 days. For more information, the general public can call the Safe Drinking Water Hotline at 800-426-4791. A fact sheet, the proposal and additional information are also available at: <http://www.epa.gov/safewater/gwr.html>

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CITY OF PENDLETON WATER TREATMENT PLANT (WTP) AND AQUIFER STORAGE & RECOVER (ASR) PROJECT

by Bob Patterson, PE

The City of Pendleton, population 17,100, is located in Eastern Oregon. Pendleton is best known for the Round-Up held during the second full week in September and the wool shirts and blankets bearing the *Pendleton* name. The City of Pendleton is embarking on a major water project designed to meet the City's long-term water supply issues. Eventually, the City of Pendleton may become well known for this project.

The City presently derives its water supply from two sources: a series of "Springs" located along the Umatilla River approximately 17 miles east of Pendleton and a series of basalt wells. The City's "Springs" have recently been determined to be under the influence of surface water; therefore, their continued usage has to be addressed by the City. Also, the City has observed a continuous decline in its basalt water levels at an average rate of 3 feet per year. Due to these issues, along with other circumstances, the City is embarking on a multi-million dollar water system infrastructure project. This project will combine two innovative water system technologies: membrane filtration and aquifer storage and recovery (ASR).

Brief Background

The City's water usage has averaged about 1,500 million gallons (MG) (4,600 acre-feet or AF) per year for the last 7 years of record. 36% of the City's supply comes from the "Springs" and the other 64% from the City's wells. The City had a peak annual usage of 1,800 MG (5,525 AF) in 1996. This was the same year in which the new rate structure was initiated that increased water rates at 15% each year for 3 years. Water usage in 1997 dropped to 1,360 MG (4,175 AF) due to the new rates. The revenue generated from this rate increase was earmarked specifically for the water project. The City is presently accruing under \$1 million per year for this project. The City is also eligible to borrow \$2 million from the State Revolving Loan Fund. The City expects to fully fund the water project with these revenues.

In 1995, the City of Pendleton completed its most recent Water System Master Plan. The Master Plan identified a need for the City to construct a water treatment plant as the first step in developing an additional water supply. The Master Plan also contained recommendations for water conservation management, ASR, and other infrastructure upgrades. For water treatment purposes, the Master Plan identified three options for the City to explore:

- ✓ Membrane filtration
- ✓ Rapid sand filtration
- ✓ Slow sand filtration

The Master Plan recommendation was to pursue slow sand filtration. It was believed that the water quality in the Umatilla River would allow for effective slow sand filtration. The City preferred to use a technology that was relatively easy to operate and maintain. Also, membrane technology was fairly new and quite a bit more expensive than either convention or slow sand filtration.

In 1997 and 1998, the City conducted a Slow Sand Filtration Pilot Study utilizing water from the Umatilla River. The pilot study confirmed that slow sand filtration was not a viable treatment option for water from the Umatilla River. Slow sand filtration did not effectively reduce turbidity levels to meet regulatory requirements for filtered water. This also meant that the water quality was not preferable for ASR. The presence of algae during the summer months also imposed limitations on the performance of slow sand filtration.

Based on the outcome of this pilot study, the City began to assess membrane technology as a feasible water treatment alternative. Membrane filtration technology was becoming increasingly more effective on a cost per gallon treated basis in comparison to convention treatment and slow sand filtration. The City began a more detailed exploration and found this technology provided a physical barrier to pathogens and believed it would be easier to operate and maintain with existing staff levels in comparison to the development of a convention treatment facility.

In 1998 and 1999, the City and its neighbor, the Confederated Tribes of the Umatilla Indian Reservation, jointly contracted with a Consultant to conduct a feasibility study for the best location of a water treatment plant (WTP) to jointly serve both communities and to provide the costs for an off-stream impoundment. The Consultant provided an estimate of over \$8.6 million for a 1,300 MG (4,000 AF) off-stream impoundment. This estimate did not include the associated expense of the intake structure, related piping, and pumping costs. The Consultant also recommended the location of the WTP at one of the City's preferred locations. The City firmly believed, and still does, that ASR can be developed to store surface water at less expense than the off-stream impoundment option.

Scope of the WTP and ASR Project

The City is preparing to design and construct a 6 million gallon per day (MGD) membrane filtration WTP that is readily expandable to 10 MGD. The City is also advancing with the development of an ASR pilot project that will coincide with the construction of the WTP.

Ultimately, the City's goal is to reduce its reliance on the declining groundwater and eventually rely on 100% surface water for its source of supply. This will be accomplished by treating water from the Umatilla River, which flows through Pendleton, and storing a portion of the treated water in the City's basalt wells. Due to water right issues, the City will be able to treat water

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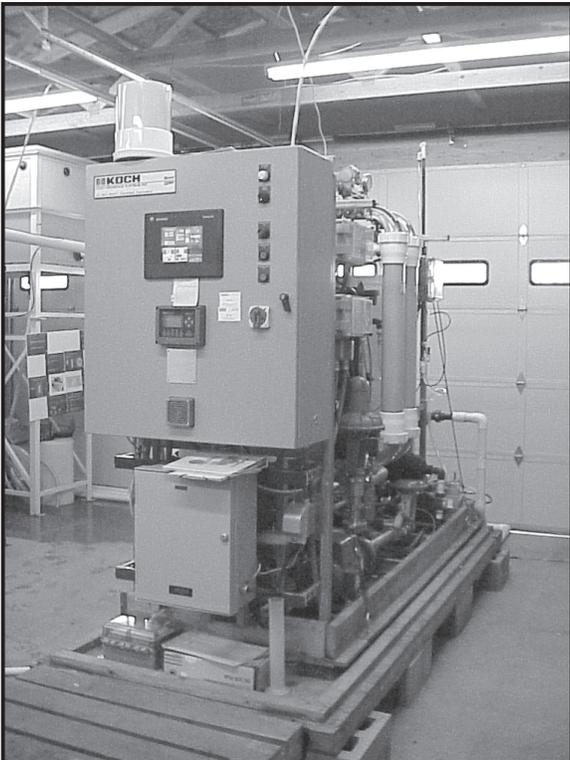
PENDLETON WTP & ASR PROJECT *(Continued from page 5)*

for a 6 to 7 month period during the “high flow” months from the Umatilla River. The City also has a year round water right of 1.3 MGD from the Umatilla River. The City will be assessing the use of this water right in relation to this project.

The City’s low demand period coincides with the operation of the proposed WTP during the “high flow” months in the Umatilla River. Our customers will consume approximately half of the treated water during these months and the rest will be stored in the City’s basalt wells. The stored water will be recovered during the summer months when the City is no longer able to treat 6 MGD of water from the Umatilla River.

The WTP will provide approximately 1,080 MG (3,315 AF) of treated water during 6 months of operation. The ASR pilot program will initially store 2.5 to 3.5 MGD for a period of at least 5 months. This would equate to 375 MG (1,150 AF) to 525 MG (1,610 AF) of treated water from the WTP being stored in the City’s ASR pilot well(s). The City will effectively reduce its reliance on the basalt well water from 64% to 28% with this project. If the WTP were used year round, approximately 234 MG (718 AF) of additional treated water would be supplied, further reducing the reliance on basalt well water from 28% to 12%. Additional expansion of the WTP and ASR program will assist the City in reaching its long-term goal of no further decline in the basalt water levels, and possibly observe a natural increase in the basalt water levels.

The City is presently conducting a Membrane Filtration Pilot Study, drilling a new well for ASR purposes, and selecting a Consultant to assist with the overall design and construction of the water project.



The Membrane Filtration Pilot Study is designed to address the overall performance of four manufacturer’s membranes against the water quality of the Umatilla River. The manufacturers participating in the pilot study are KOCH Membrane Systems, Pall Corporation, USFilter/Memcor, and Zenon Environmental (see photo, this page). To participate in our pilot study, they had to demonstrate that their membranes are certified in meeting the National Sanitation Foundation (NSF) 61 Drinking Water Standard, which is also an Oregon Health Division construction standard requirement.

The pilot study will be conducted until the end of June 2000. Based on background levels of Total Organic Carbon (TOC), alkalinity, iron/manganese, and algae, the City will have to provide for pretreatment in the full-scale design. During this pilot study, City staff will try to assess pretreatment performance, especially related to meeting a 35% TOC reduction in accordance with the enhanced coagulation requirements from the Disinfection-Disinfection By-Products Rule.

The overall water project has been divided into three phases for Consultant services:

- Phase One will involve assisting the City with completion of the membrane filtration pilot study and final procurement of membrane filtration equipment. The Consultant will also develop a hydrogeologic characterization of the City’s basalt wells and the ASR pilot program; complete the design and construction of the new well control and ASR facility; and assist with the selection of one or two additional existing wells for modification to ASR wells. The Consultant will also assist with permitting requirements for the WTP and ASR pilot program and develop a cost-benefit analysis for hydropower production during ASR injection.
- Phase Two will involve the design of the membrane water treatment plant, intake, and related conveyance infrastructure, along with designing and modifying one or two existing wells for ASR piloting.
- Phase Three will involve the construction of the membrane filtration WTP and the start-up of the ASR pilot testing, as well as the development of the long-term ASR program.

The City has an aggressive schedule for completing this water project. The City expects to have the WTP operational and the ASR pilot testing underway by early 2002. The overall scale of this project will be determined by cost estimates and available funding. For more information on the development of this project, contact (541) 966-0249.

Bob Patterson is a registered PE in Oregon and is the Special Projects Engineer for the City of Pendleton. He was previously employed as the CTUIR Public Works Director from January 1996 - September 1999. He also was previously employed as the City of Pendleton Regulatory Specialist from May 1994 – January 1996. He even had a prior life with the Oregon Health Division Drinking Water Section based out of the Pendleton office from April 1988 – May 1994.

PROTOCOLS REQUIRED FOR CONTINUOUS TURBIDITY MONITORING

by Carrie Gentry

According to the Health Division's rules (OAR 333-061-0036(4)(a)(B)), water systems that use surface water must monitor turbidity by performing representative grab samples of source water. A water system "...may substitute continuous turbidity monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Division." What does this mean? If you're using a turbidimeter that continuously monitors turbidity, then you need to develop a protocol and turn it into us for approval.

EPA has provided some detailed guidance on this subject in their Guidance Manual for Compliance with the Interim Enhanced Surface Water Treatment Rule: Turbidity Provisions (EPA 815-R-99-010, April 1999). This article will summarize the important aspects of the requirements for a protocol. The Health Division, as part of the biennial Turbidity Quality Assurance program, will be asking for each water system's protocol. The protocols will need to be submitted to the Health Division for review and approval. The Turbidity Quality Assurance program will take place in July this year, so now is the time to start thinking about putting together a protocol.

A protocol is basically a set of instructions that describes how and when to clean, maintain, calibrate, and verify the instrument. It should identify the brand and model number of the turbidimeter and address the three areas described below (standards used, operation and maintenance, and calibration and verification).

Standards

There are two types of standards: primary and secondary. Primary standards are used to calibrate the turbidimeter. There are three primary standards that are recognized by EPA:

- Formazin (either user prepared or commercially produced)
- AMCO-AEPA-1
- Stabcal

Keep in mind that some instruments have been designed and calibrated on specific primary standards. Contact the manufacturer of the instrument if there are questions. The protocol should identify which primary standard is recommended for calibration of the turbidimeter.

Secondary standards are used for monitoring day-to-day accuracy (also known as verification). They are used to determine whether or not the turbidimeter is producing measurements within acceptable limits. The protocol should identify which primary standard is used. Some examples of secondary standards include:

- gelex
- glass/ceramic cubes
- manufacturers provided secondary standards (instrument specific)

Cleaning and Maintenance

A regular cleaning schedule should be established. The frequency will depend on the location of the instrument and the raw water quality. The protocol should describe which times to inspect and clean (such as lenses, light source, and sample lines) as well as what materials should be used to clean the items. Recalibration of the turbidimeter should be completed after any significant maintenance or cleaning. Additionally, sample flow rates should be verified at least weekly and compared to the range specified by the manufacturer.

Calibration and Verification

EPA has two guidelines for calibration of turbidimeters. For combined filter effluent monitoring, calibration should take place weekly. For individual filter effluent monitoring, calibrate at least monthly.

The accuracy of the calibration should be verified using primary, secondary, or by comparison to a properly calibrated turbidimeter. If there is a significant deviation from the manufacturer's standard ($> \pm 10\%$), the deviation should trigger a thorough cleaning and recalibration with primary standards. **Do not** calibrate by comparing with a benchtop turbidimeter. Also, please note that calibration is different than verification.

Specific calibration procedures should be developed for individual instrument locations (i.e. - if you have two turbidimeters, you should have two protocols). The protocol should provide detailed steps of the calibration procedures, keeping the following points in mind:

- Select a frequency for checking instruments with secondary standards and for full recalibration with primary standards.
- Establish an acceptable deviation from the primary standard during secondary verifications (maximum deviation $\pm 10\%$)
- Identify and schedule dates for full turbidimeter calibration
- Maintain adequate supplies (monitor shelf-life of standards)
- Assign calibration duties to specific individuals
- Create standard operating procedure for conducting a calibration and post next to turbidimeter
- After calibration, verify performance with secondary standard or by comparison with another properly calibrated instrument.

Again, the Health Division will be requesting a copy of the protocol sometime in July. If your water system already has one completed, then simply read it over and make sure it addresses the points made in this article and make appropriate changes. If you must start from scratch, use the guidelines here to develop the protocol. Keep in mind that the protocol should be easy to read, understand, and follow. If you have any questions, call Carrie Gentry at (503) 731-4317. You can find EPA's guidance manual on-line at <http://www.epa.gov/dariton/clhtml/pubtitle.html> (page 39 of the on-line document is the beginning of the information useful to developing a protocol).

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 Oregon Health Division
 Drinking Water Program
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 Portland OR 97293-0450



**PERIODICALS
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TRAINING CALENDAR

Oregon Association of Water Utilities

- (503) 873-8353
- Aug. 2 Chlorine Safety & Handling
- Aug. 2 Small Water System O&M
- Aug. 23-24 Summer Classic VI
- Sept. 6-7 Pumps & Pumping
- Sept. 9-10 WT & WD Certification Review
- Sept. 12 Math for Operators
- Sept. 14 Source Water Protection
- Sept. 21 Treatment Technologies;
 Innovative Water
- Sept. 27-28 WT&WD Certification
 Review

Oregon Chapter American Public Works Association

- (541) 926-0044
- Sept. 27-28 Stormwater Maintenance &
 Design

RCAC

- Chris Marko/(541) 279-1469
- Drinking Water System Finance Workshops
- July 10 The Dalles
- July 12 John Day
- July 14 Klamath Falls

OCCIRS

- Chuck Commiskey/(541) 267-3128
- Aug. 18 Confined Space Safety

Cross Connection/Backflow Courses

- Backflow Management Inc. (B)
 (503) 255-1619
- Clackamas Community College (C)
 (503) 657-6958 ext. 2388
- Backflow Assembly Tester Course
 Sept. 18-22 Oregon City (C)
- Backflow Assembly Tester Recertification
 Oct. 20 Oregon City (C)

Oregon Health Division

- Bart Stepp / (541) 276-8006 ext. 354
- Aug. 10 Slip Lining Technical Session
- Sept. 7 How to do DMR's

Water System Training Course

- Oregon Health Division
- Marsha Fox/(503) 731-4899
- July 18 Eugene
- Aug. 24 Klamath Falls
- Sept. 21 Bend

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